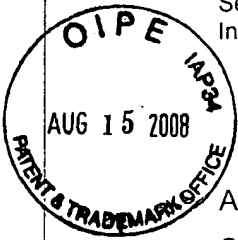


Serial No.: 10/066,738
Inventor(s): Ramesh Keshavaraj

US PTO Customer No. 25280
Case No.: 2102 REI



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Ramesh Keshavaraj
Serial Number: 10/066,738
Filed: February 4, 2002
For: **AIRBAG FABRIC POSSESSING VERY LOW COVER FACTOR**
Group Art Unit: 1771
Examiner: Singh, Arti R.

Commissioner for Patents
PO Box 1450
Alexandria VA 22313-1450

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Date: AUGUST 15, 2008

Signature: Linda-Ann Manley

Name: Linda-Ann Manley

Sir:

SECOND SUPPLEMENTAL DECLARATION BY RAMESH KESHAVARAJ

1. My name is Ramesh Keshavaraj and I reside at 305 Grovewood Lane, Peachtree City, Georgia, United States of America, 30269.
2. I received a Bachelor of Science degree in Chemical Engineering from C.I.T. in India, a Master's degree in Chemical Engineering from The Texas Technological University in Lubbock, Texas, and a Doctorate in Chemical Engineering from The Texas Technological University, in Lubbock, Texas.
3. For the last twelve years I have been employed by Milliken & Company headquartered in Spartanburg, South Carolina, with my employment located in the city of LaGrange, Georgia.
4. My experience in the textile industry has been devoted to the research, design and processing of airbag fabrics and airbag cushion products. My current position with Milliken & Company is as a Global Technology Director of Airbag Products. My work

has primarily focused on the development of fabrics and cushion products for airbag uses within automobiles.

5. The invention as described and claimed is directed to a novel product that solves the problem of making a cost effective airbag using a woven fabric substrate with a minimal fabric density (i.e. low cover factor of below about 1600), using yarns from about 100 to about 630 denier, and achieving a low air permeability. In the past, a challenge has been to construct an airbag using less fabric density (low cover factor, low denier), and heavier amounts of coating, with the goal to achieve a very low air permeability. It has been known that one could use very, very large amounts of coating to compensate for low fabric density, and achieve a low or no permeability airbag. But, unfortunately, such large amounts of coating are much too expensive for real world applications in which the cost of airbags must remain at a minimum. Further, as a coating gets heavier it becomes harder to fold and pack the airbag in the limited available space like modern day steering columns. Coating is expensive, and airbag designers would prefer to use only the minimal amount of coating to achieve the desired lower air permeability and best foldability. The invention, therefore, comprises a product that employs a minimal fabric density, using about 100 to about 630 denier yarn size range, and also achieving the claimed low air permeability.

6. I have reviewed the recent June 26, 2008 Decision on Appeal of the Board of Patent Appeals, and this Declaration responds to issues raised in the Decision on Appeal.

7. Comparative Example 5 of Moriwaki Discourages Use of Low Cover Factor

Moriwaki in comparative example 5, as taught in the reference, would discourage

a person of skill in the art from using low cover factor. Comparative example 5 in Moriwaki is the only example disclosed on that particular reference that is reported to have a permeability of zero (i.e. 0 cc/cm²/sec). But, as reported in the Decision on Appeal, this example of Moriwaki also has a denier of 840, which is substantially higher than the claimed yarn denier in the invention of "about 100 to about 630". Further, this Moriwaki example discloses an unusually thick coating (i.e. the coating thickness reported is 85 microns as specified in Col 11, line 46). The fact that large amounts of coating may be applied to in a heavy denier (840 denier fabric) to reduce air permeability zero does not represent a teaching of the invention of this application. This Moriwaki example uses relatively heavy 840 denier nylon 6, 6 fabric at a cover factor of 1476. As the cover factor cited is low, the coating weight or thickness needs to be very, very high in order to achieve air permeability of zero. This 85 micron thickness is a very high coating thickness. This teaching would discourage a person of skill in the art from using this example. Such a high coating thickness would not present a commercial viable option in today's automobile, due to excessive cost of the large amount of coating required to achieve acceptable air permeability.

8. Moriwaki's actual claimed invention was not comparative example 5, however. Moriwaki's teachings, and his alleged invention, was directed to other embodiments. These other embodiments, favored by Moriwaki, use much higher cover factor. Moriwaki's teaching was to weave *higher construction cover factor fabrics* as specified in Table 1 of the Moriwaki patent, as in examples 1 to 9.

9. The Decision on Appeal indicated a need (on page 13) for conversion of air permeability values of Moriwaki from cc/cm²/sec to cubic feet per minute. Below are

such conversions for the Moriwaki prior art:

Example #	Cover Factor		Air Permeability		
	Number in Patent	Where	Number Reported in Moriwaki Patent cc/cm2/sec	Converted to feet3/min (CFM, cubic feet per minute)	Where
1	2172	Col. 10, line 35	6.5	12.7	Col. 10, line 31
2	2172	Col. 10, line 35	6.7	13.1	Col. 10, line 31
3	2172	Col. 10, line 55	25.3	49.8	Col. 11, line 12
4	2129	Col. 10, line 55	6.1	12	Col. 11, line 12
5	2129	Col. 10, line 55	24.8	48.8	Col. 11, line 12
6	2254	Col. 11, Line 37	7.1	13.9	Col. 11, Line 54
7	2254	Col. 11, Line 37	22.5	44.3	Col. 11, Line 54
8	2254	Col. 11, Line 37	13.1	25.7	Col. 11, Line 54

10. It is important to note that Morakawi provides no examples of low fabric construction which also achieving an air permeability of zero (0 cc/ cm2/sec). In fact, the Table above shows that Moriwaki does not provide in examples 1-8 any embodiments that reveal an air permeability less than 0.5 cfm, as claimed in the present invention. Moriwaki's disclosure does not teach the invention. Moriwaki's teachings actually are contrary to the invention, since Moriwaki actually suggests

making a fabric using the highest cover factor fabric possible on the weaving machine commercially available today, and then applying a light weight thickness coating further to reduce the air permeability to a smaller degree --- but with examples that do not achieve air permeability of less than 0.5 cfm.

11. Fabric Foldability:

It is my belief that the reason Moriwaki monitored fabric foldability is because foldability of the comparative example 5 cited with 840 denier fiber (i.e. Comparative example 5 of Moriwaki) was inferior. This may have been because of the unusually and unsustainable heavier coat weight/ thickness that would be required in such device in order to achieve zero air permeability. Again, the actual recommended examples that are cited by Moriwaki are very high cover factor fabrics that are known to be poor in terms of foldability even before a coating is applied

12. The foldability as described in Col. 6, line 27 of Moriwaki is vague and cannot be replicated or verified by one skilled in the art as it is described as a relative value in a unique airbag module with a reference of a silicone coated airbag with 45 grams per square meter coating weight. It is well known that when Moriwaki patent application was filed in 1999, silicone coated fabric was the fabric of choice in Japan. Therefore, silicone coated fabric should have been used as a prior art example rather than comparative example 5 -- which instead uses a relatively heavy coating of chloroprene rubber in order to draw the distinction from prior art.

13. The teachings of Moriwaki are contrary to the claimed invention. The claimed invention also is not obvious in light of the disclosure set forth in Moriwaki.

14. It is my belief that the Moriwaki embodiments would not provide foldability that is suitable or comparable to the claimed invention of this application. Even Moriwaki himself, in his application, states that foldability of his comparative example 5 is poor and undesirable:

"The base fabric for air bags of Comparative Example 5 was excellent in the prevention of fraying and low air permeability, *but was so hard as to impair foldability and to complicate processing disadvantageously having regard to productivity*";

US Patent No. 6, 291, 040 (Moriwaki), col. 9, lines 7-11 (emphasis supplied).

It appears to me that even Moriwaki himself was indicating the inoperability of his Comparative Example 5, as unsuitable for use for reasons of foldability and also processing disadvantages or problems.

15. I am familiar with the fabrics manufactured by Toray Industries, the assignee of the '040 Moriwaki prior art patent. I obtained samples of fabrics made in accordance with the Moriwaki patent. Specifically, I obtained an example of the Toray fabric which was a commercially available fabric manufactured in accordance with the '040 patent having a cover factor of 1885, with 420 denier nylon 6,6 yarns and a thread count of 46 X 46 threads per inch in both the warp and weft directions. This fabric had approximately 5 micron thick coating of what is believed to be an anionic ionomer type polyester based urethane resin (from the examples of the '040 patent). I tested that fabric (the "Moriwaki fabric") which was made according to the '040 patent, and the Moriwaki fabric had an air permeability of 11 cc/sq. cm /sec.

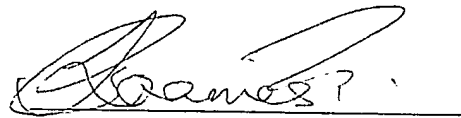
16. I also tested a fabric made according to the invention claimed in this pending application using the test method outlined in the '040 patent, to make a direct

comparison. Air permeability of the fabric of my invention was tested per the reported method of Moriwaki et al (cc/cm²/sec at 0.2 Kg/cm³ pressure drop.) Using the teachings of my invention, the permeability is zero. Thus, the invention disclosed here is superior to the teachings of Moriwaki with regard to air permeability, and there is no teaching of the achievement of the invention in the disclosure of Moriwaki. Moriwaki does not disclose the invention of this application. Thus, not only does Moriwaki fail to disclose a fabric achieving the air permeability at comparable conditions, but Moriwaki also does not teach the combination of the invention with regard to minimal fabric density, about 100 to about 630 denier yarn size range, achieving the claimed air permeability.

17. In my opinion the Moriwaki patent disclosure fails to teach the airbag fabric invention of my application as in the currently claimed invention. The results indicate a lack of disclosure of my claimed invention. Furthermore, this reference fails to provide instructions for altering the preferred embodiments or motivation for doing making such alterations. Thus, in my view the invention of this application is not obvious in light of Moriwaki, and there is no evident or apparent alteration of Moriwaki comparative example 5 that would achieve the invention.

18. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the above-referenced application or any patent issuing thereon.

Date: Aug 15, 2008

A handwritten signature in black ink, appearing to read "Ramesh", written over a horizontal line.

Dr. Ramesh Keshavaraj, PhD